Longwood Bridge
(Black River Bridge)
Spanning the Black River at Church Road
Vicinity of Longwood
Clark County
Wisconsin

HAER No. WI-6

HAER
WIS
10-LONG.V,
1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
Denver, Colorado 80225-0287

HISTORIC AMERICAN ENGINEERING RECORD
LONGWOOD BRIDGE
(Black River Bridge)
HAER No. WI-6

HAER
WIS
10-LONG.V,
1-

Location:	Spanning the Black River at Church Road in the vicinity of the Village of Longwood, Clark County, Wisconsin.
UTM:	A: (east end): 15:686180:4972745 B: (west end): 15:686245:4972755
Quad:	Lombard, Wisconsin (7.5-minute series)
Date of Construction:	1900
Present Owner:	None
Present Use:	Demolished in 1984
Significance:	The Longwood Bridge was one of two remaining pin-connected Camelback trusses in Wisconsin identified in a 1981 survey. The other—the Manchester Bridge (1884)—survives, although it has been relocated. Wisconsin also had three riveted Camelback trusses in 1981; all have since been replaced.
Project Information:	Documentation of the Longwood Bridge was begun in 1983 by Robert S. Newbery, Wisconsin Department of Transportation Staff Historian, and completed in 1994 by Amy A. Ross, Architectural Historian at Mead & Hunt, Inc.

HISTORICAL BACKGROUND

Clark County, located in west-central Wisconsin, was settled in the middle of the nineteenth century. The county is in the Mississippi Valley and is drained by three of the river systems of that waterway: the Black River; the Eau Claire River, a tributary of the Chippewa system; and the Yellow and Eau Pleine rivers of the Wisconsin system.[1] These geographical advantages, along with its wealth of timber and animals, attracted the first explorers.

James O'Neill, the first white settler in Clark County and the founder of Neillsville, was a "rough-and-ready" pioneer lumberman and sawmill operator from Lisbon, New York. Arriving in 1845 with two other men, O'Neill built a cabin on a creek adjacent to the Black River. They then began to construct a sawmill. Though settlement was slow, enough settlers had arrived in Neillsville by 1854 to justify naming the community the county seat and platting the town the following year.[2]

Clark County was well suited to the timber industry. It was generally covered by the Northern Mesic Forest, which included maple, hemlock, and yellow birch trees, as well as heavy concentrations of white and red pine along its south and west borders.[3] All of the settlers who came during the early period were associated with this industry and were attracted to the area by its vast stands of timber.[4] Small crossroads communities soon developed around Clark County's lumberyards.

The village of Longwood, located two miles east of the Longwood Bridge in the north part of the county, was once a prosperous and promising community. Important in the lumbering days of Clark County, Longwood had a post office by 1873. Niran Withee, a prominent Clark County lumberman

---

[1] History of Clark County, Wisconsin, comp. by Franklyn Curtiss-Wedge (Chicago and Winona, Ill.: H.C. Cooper & Co., 1918) 17.

[2] Neillsville--100 Years as a City (Neillsville, Wisc.: Clark County Press, 1982); History of Northern Wisconsin (Chicago: Western Historical Company, 1881) 228-29, 231, 234, 235. When the county was organized in 1854, it contained only about twenty-five homesteads; see History of Clark County 35-60.

[3] Early Vegetation of Wisconsin (Madison, Wisc.: UW-Extension, Geological and Natural History Survey, 1965) map.

[4] Northern Wisconsin 228-29.

and politician, built a stave and heading mill there and opened the first cheese factory in that part of the county. In the early 1880s, the Wisconsin Central Line opened up the area for commerce. In 1895, Longwood's population of 100 was served by numerous businesses, including a general store, hotel, grocery, shoemaker, and carpenter. The railroad bypassed Longwood, however, and the twin villages of Owen and Withee—which were located four miles to the north and had a depot—soon surpassed Longwood in population.[5] The 1911-12 Wisconsin State Gazetteer and Business Directory indicated that Longwood no longer had a post office.[6] Nevertheless, the village continued to be a rural agricultural service center with a store, blacksmith shop, cheese factory, and school house surviving past World War I, and a handful of commercial businesses still operating today.[7]

Early river and creek crossings in the area were fords, crude bridges or rafts.[8] In 1873, the only bridge across the Black River indicated on a map of Clark County was the one in the town of Levis, south of Neillsville.[9] By 1880, several crossings were indicated including a bridge one-half mile upstream; another one mile downstream; a third, two miles upstream; and another five miles downstream at Hemlock.[10] The Longwood Bridge, built in 1900, was likely the first crossing of the Black River to be located on the line between Sections 20 and 29. On a 1893 map of the Hixon

---

[5] The towns of Withee and Owen, both small crossroads communities at the end of the 19th century, had mushroomed into substantial business and trade centers by 1910. Withee, which had only 100 residents in 1895, grew to 650 residents in the first decade of the 20th century and boasted three churches, a bank, and weekly newspaper in 1911. Owen, located 1 1/4 miles to the east, began as a lumber yard and was not even included in the 1901-02 state business directory. A decade later, Owen was an incorporated village with a population of 800 served by two railways. See Wisconsin State Gazetteer and Business Directory, 1895-96, 1901-02, 1903-04, 1911-12 editions (Chicago: R.L. Polk & Co., various years). A decade later the population of the entire township had been only 422; see report of 1900 census figures in Republican and Press 7 March 1901.

[6] Wisconsin State Gazetteer 1911-12.

[7] Historical Atlas of Wisconsin (Milwaukee: Synder and Van Vechten, 1878) 107; Curtiss-Wedge 664, 118, 317-18; see also Clark County Centennial Inc., The Book of the Years: The Story of the Men Who Made Clark County (Neillsville, Wisc.: Clark Co. Press, [1953]) F-20.

[8] History of Clark County 135-38.

[9] Map of Clark County, Wisconsin (N.p.: MacBride & Allen, 1873).

[10] Map of the County of Clark (Neillsville, Wisc.: Charles E. Bussell, pub., 1880). The first crossing at Hemlock may have been a road along the top of a logging dam; see Clark County Centennial Inc. F-19.

township, of which Longwood was then a part, no crossing was indicated at this site.[11] The Standard Atlas of Clark County (1906) locates the Longwood Bridge, as well as the four other nearby Black River crossings.[12]

L.H. Johnson was paid $4,224 to erect the Longwood Bridge, of which the township and the county each paid half. A contractor and bridge manufacturer, Johnson was likely involved in all aspects of the bridge's construction. According to the November 22, 1900, proceedings of the County Board, this bridge was not yet completed. However, by January 1901, the County Bridge Committee had accepted the new bridge and made a motion to allow payment of the county's share. Johnson built at least three other bridges for towns in Clark county in 1900 and 1901, one of them 230 feet long.[13]

The original bridge at Church Road consisted only of the 159-foot Camelback span built by Johnson. The 60-foot Pratt half-hip span was added in 1905 after a washout swept away the west approach to the older bridge. The two spans required repairs in 1913. The wood joists on the 159' span were replaced with steel joists, over which a new wood deck was installed. A steel railing was also added. In addition, the two spans had jammed against each other, resulting in undue strain on some truss members. The 60-foot span was moved westward sufficiently to clear the 159-foot span. The east end of the 60-foot span was also lowered so as to allow the joists in the end panel to rest on the pier beam. The bridge was also cleaned and painted at this time.[14]

ENGINEERING DESCRIPTION

The Longwood bridge was a two-span, nine-panel structure located on Church Road over the Black River in Longwood Township, Clark County. The main span was a 159'-0" Camelback truss erected in 1901 by Minneapolis bridge builder, L.H. Johnson. A 60'-0" Pratt half-hip approach span on the west end of the bridge was built in 1905 after high water carried away the west approach and fill leaving a 60-foot-wide space.[15] The roadway width was 15'-7" and the overall length, 221'-2".

---

[11] Clark County Plats (Neillsville, Wisc.: C.S. Stockwell, pub., 1893).

[12] Standard Atlas of Clark County (Chicago: Geo. A. Ogle & Co., 1906).

[13] Clark County Board of Supervisors, Proceedings for the Year 1900 (N.p.: published by the Board, [1900]) 1, 12, 23; Proceedings for the Year 1901 34, 44-45. In 1902, the County Bridge Committee approved payment to L.H. Johnson for his work on three bridges in Clark County, in the towns of Hewett, Lynn and York; see Proceedings for the Year 1902 9.

[14] "Report of Bridge Survey" and Supplementary Specifications, 14 February 1913, Wisconsin Department of Transportation, Bridge Section.

[15] Proceedings for the Year 1905 3.

The main span was a significant example of the Camelback truss configuration, only five of which were known to have been built in Wisconsin.

The two truss designs that came to dominate highway bridge construction by the late 19th century were the Warren and the Pratt. The Warren truss was patented by two British engineers in 1840. In this design, the vertical members handle only nominal stress, while the diagonals serve as both tension and compression members.[16] The Pratt truss, patented by Caleb and Thomas Pratt in 1844, features vertical compression and diagonal tension members. Although originally built with both wood and metal members, the Pratt truss was not as efficient in that form as the Howe. As an all-metal bridge, however, the Pratt had the advantage because it used less iron and was easier to erect. The oldest existing truss bridge in Wisconsin, the 1877 White River Bridge in Burlington, is a Pratt.[17]

During the 1870s, an important variation of the Pratt design was introduced for long-span bridges. Because the depth of truss required in the center of a bridge is greater than at the abutments, a considerable amount of material can be saved on a long-span structure by "bending" the top chord into a polygonal configuration known as a "Parker" truss. If the top chord has exactly five sides, the bridge, by convention, is called a "Camelback" truss. The addition of substruts and/or subties makes a Pratt into a Baltimore and a Parker into a Pennsylvania.[18]

The Longwood Bridge was one of two pin-connected Camelback truss bridges identified in a 1981 survey of Wisconsin metal trusses. There were also three riveted Camelbacks in the state. With the exception of the Manchester Street Bridge, which was relocated in 1987, all have since been demolished. The Manchester Street Bridge is a 128-foot, seven-panel Camelback truss manufactured in 1884 by the Milwaukee Bridge and Iron Company. Like the Longwood Bridge, it has pinned connections and latticed portals. Of the three riveted Camelbacks, one had the latticed portals while the other two had angle irons in a trapezoidal "A" configuration. Built between 1914 and 1922, the riveted examples also had more substantial members than the pin-connected ones.[19]

---

[16] T. Allan Comp and Donald Jackson, "Bridge Truss Types: A Guide to Dating and Identifying," American Association for State and Local History, Technical Leaflet 95, History News 32.5 (1977); Working Files, Historic Bridge Advisory Committee (HBAC), Wisconsin Department of Transportation, 1981.

[17] Comp and Jackson. A few all metal Howe trusses were built, including, apparently, one built in Watertown in 1875; see Diane Kromm, "Milford Bridge," Historic American Engineering Record Report, (HAER No. WI-21, 1987) 2.

[18] Comp and Jackson.

[19] Working Files, HBAC. The three examples were: the Kennedy Bridge (1914) in Marathon County, builder unknown; the CTH "A" Bridge (1922) in St. Croix County, a State Highway Commission (SHC) designed structure; and the Jump River Bridge (1924) in Price County, also a SHC design.

The Camelback may enjoy greater legitimacy today among truss bridge buffs than it did in the past among contemporary engineers. According to the current standard guide to the history of truss types, the Camelback's "greater standardization...and better stress distribution" made it "the most economical truss for many railroad and highway spans." The guide claims the Camelback is common throughout the United States.[20] One 1912 textbook, however, simply referred to all Pratt types with a polygonal top chord as "the broken or inclined upper chord truss."[21]

Although the Wisconsin State Highway Commission continued to design Camelbacks into the 1920s, J.A.L. Waddell lists it as one of a number of "antiquated" types in his 1921 text, Bridge Engineering.[22] Waddell claimed this style of truss was first designed by a "large bridge company for the purpose of saving some metal and the shop cost of changing the inclination of the top chord at each panel point." He asserted, however, that this design was peculiarly subject to stress reversals as well as being "uncompromisingly ugly."[23] Certainly, the Longwood Bridge's outline, a rectangle with the corners clipped, was not as aesthetically pleasing as the curve Waddell advocated for polygonal top chord trusses.[24]

The Longwood Bridge was of very light construction and was clearly an example of the light wagon bridge that many contemporary professional engineers disdained.[25] It had a very light wood plank floor and the sway bracing was deep but unusually thin. Eyebars were used instead of heavier sections for the bottom chord, counters, and diagonals. The bridge had the less common, and presumably older style, latticed portal braces. Both the portal and the sway bracing were

---

[20] Comp and Jackson 5-6.

[21] William H. Burr and Myron S. Falk, The Design and Construction of Metallic Bridges (New York, 1912) 42.

[22] Microfilm Reel M-1, Wisconsin Department of Transportation, Bridge Section; J.A.L. Waddell, Bridge Engineering (1st ed., 1916; New York: J. Wiley & Sons, 1925) 468, 477-78.

[23] Waddell 477-78.

[24] Waddell 479.

[25] For a discussion of the struggle to establish professional standards see Ballard C. Campbell, "The Good Roads Movement in Wisconsin, 1890-1911," Wisconsin Magazine of History 49.4 (1966): 273-93; W.O. Hotchkiss, First Biennial Report of the Highway Division, Road Pamphlet No. 5 (Madison, Wisc.: Wisconsin Geological and Natural History Survey, 1909) 47; Wisconsin State Highway Commission, Second Biennial Report...1911 to 1915 (Madison, Wisc.: published by the State, 1915) 30; Wisconsin State Highway Commission, Fifth Biennial Report, 1922-1924 (Madison, Wisc.: published by the State, 1924) 70-73; M.G. Davis, A History of Wisconsin Highway Development, 1825-1945 (Madison, Wisc.: Wisconsin Department of Transportation, 1945) 16-17.

apparently riveted in the shop, transported as assembled units to the bridge site, and bolted in place there. The top lateral hitch also appears to have been fabricated and riveted to the top chord in the shop. The floor beams were hung from the bottom chord by using connecting pins and U-bolts.

L.H. JOHNSON AND THE HENNEPIN BRIDGE COMPANY

Lawrence Henry Johnson, founder of the Hennepin Bridge Company, came to the United States from Germany in 1875 at the age of 12. He attended school in Augusta, New York. In 1879, he moved with his family to Michigan where, the following year, he was appointed post office clerk at Greenville, Michigan. He moved to Minnesota in 1883 and joined the Minneapolis Bridge Company, where he was employed for about 5 years. He was later an agent for the Wrought Iron Bridge Company. In March 1900, he went into business for himself and founded the Hennepin Bridge Company, based in Minneapolis. The Hennepin Bridge Company was incorporated in 1905 with Johnson as president.

Albert Nelson Marquis reported in his biographical sketch of Johnson that "the firm has been eminently successful in large undertakings," which Marquis qualified by listing bridges built by the Hennepin Bridge Company over the Mississippi River at both Hastings and Rice, Minnesota, and another across the Yellowstone River near Billings, Montana. Marquis also noted that Johnson was elected to the Minnesota Legislature in 1901, later served as Speaker of the House of Representatives, and was also a member of several fraternal organizations.[26]

---

[26] Albert Nelson Marquis, Book of Minnesotans (Chicago; A.N. Marquis Co., 1907) 265; and Fred L. Quivik, "Montana's Minnesota Bridge Builders," Industrial Archeology 10.1 (1984): 47.

BIBLIOGRAPHY

Primary Sources

Clark County Board of Supervisors. Proceedings for the Year 1900. N.p.: published by the Board [1900].

_____. Proceedings for the Year 1901. N.p.: published by the Board [1900].

_____. Proceedings for the Year 1902. N.p.: published by the Board [1900].

Microfilm Reel M-1. Wisconsin Department of Transportation, Bridge Section.

"Report of Bridge Survey" and Supplementary Specifications. 14 February 1913. Wisconsin Department of Transportation, Bridge Section.

Republican and Press 7 March 1901.

Wisconsin State Gazetteer and Business Directory. 1895-96, 1901-02, 1903-04, 1911-12 editions. Chicago: R.L. Polk & Co., various years.

Working Files, Historic Bridge Advisory Committee. Wisconsin Department of Transportation, 1981.

Secondary Sources

Burr, William H. and Myron S. Falk. The Design and Construction of Metallic Bridges. New York, 1912.

Campbell, Ballard C. "The Good Roads Movement in Wisconsin, 1890-1911." Wisconsin Magazine of History 49.4 (1966): 273-93.

Clark County Centennial Inc. The Book of the Years: The Story of the Men Who Made Clark County. Neillsville, Wisc.: Clark Co. Press, [1953].

Comp, T. Allan and Donald Jackson. "Bridge Truss Types: A Guide to Dating and Identifying." American Association for State and Local History, Technical Leaflet 95. History News 32.5 (1977).

Curtiss-Wedge, Franklyn. History of Clark County, Wisconsin. Chicago and Winona, Ill.: H.C. Cooper & Co., 1918.

Davis, M.G. A History of Wisconsin Highway Development, 1825-1945. Madison, Wisc.: Wisconsin Department of Transportation, 1945.

Hotchkiss, W.O. First Biennial Report of the Highway Division, Road Pamphlet No. 5. Madison, Wisc.: Wisconsin Geological and Natural History Survey, 1909.

Kromm, Diane. "Milford Bridge." Historic American Engineering Record Report, HAER No. WI-21, 1987.

Marquis, Albert Nelson. Book of Minnesotans. Chicago; A.N. Marquis Co., 1907.

Quivik, Fred L. "Montana's Minnesota Bridge Builders." Industrial Archeology 10.1(1984): 47.

Waddell, J.A.L. Bridge Engineering. 1st ed., 1916; New York: J. Wiley & Sons, 1925.

Wisconsin State Highway Commission. Second Biennial Report...1911 to 1915. Madison, Wisc.: published by the State, 1915.

_____. Fifth Biennial Report, 1922-1924. Madison, Wisc.: published by the State, 1924.

Maps

Clark County Plats. Neillsville, Wisc.: C.S. Stockwell, pub., 1893.

Historical Atlas of Wisconsin. Milwaukee: Synder and Van Vechten, 1878.

Map of Clark County, Wisconsin. N.p.: MacBride & Allen, 1873.

Map of the County of Clark. Neillsville, Wisc.: Charles E. Bussell, pub., 1880.

Standard Atlas of Clark County. Chicago: Geo. A. Ogle & Co., 1906.

Fig. 1 USGS Quad: Lombard, Wisconsin (7.5-minute series)
A: (east end): 15:686180:4972745
B: (west end): 15:686245:4972755